

4. NOTE ON THE HABITS OF THE MUSQUASH OF NORTH AMERICA.  
BY CAPT. G. E. BULGER, CORR. MEMB.

One day, during the early part of the spring of 1849, I was rambling about the neighbourhood of the village of St. Valentines, near Isle-aux-Noix, in Canada East, with two friends, one of whom was accompanied by a tiny Spaniel of the King-Charles breed. Presently the little dog, which had been running on in front of us, began to bark, and, looking up, I beheld him engaged in a combat with some small darkly-coloured animal, of about his own size. I hastened to the spot, and soon ascertained the dog's opponent to be a large Muskrat (*Fiber zibethicus*), which showed no disposition to retreat on my approach, but maintained the conflict with a courage and ferocity I was quite unprepared for. Indeed, after some minutes, the little rodent was so evidently getting the best of the battle, that I judged it right to interfere, and, consequently, struck him with my stick. Instead of causing him to beat a hasty retreat, as I fully expected, this assault of mine only appeared to change the current of his rage, and render him still more angry than before. He at once quitted the dog (an arrangement apparently very gratifying to the latter), and attacked me, rising on his hind legs, and making charges at my stick, which, of course, I kept between us. This strange battle, solely defensive on my part, was maintained until I thought fit to terminate it by killing my savage little adversary, which I did easily with a blow on the head. The incident appeared to me to be so odd and unaccountable, that I at first fancied it must have been the result of some peculiar idiosyncrasy on the part of the individual Muskrat, and not characteristic of his race. However, I was soon disabused of this idea; for almost immediately afterwards I saw two more of my warlike little foes under the transparent ice. I broke the latter with my stick, just above where one of the animals was standing, and, possibly, touched him with some of the fragments. However, the result was an instant onslaught on his part, though he did not appear inclined to leave the water. Whenever I held the stick to him, he attacked it furiously, but he would not follow it out of the stream, and I eventually killed him in the same manner as the first one. I only met with one more during the remainder of the walk; and with him also I had a spirited contest, similar, in most respects, to the one last described.

5. ON THE STRUCTURE OF LEPTOSOMA DISCOLOR. BY P. L. SCLATER, M.A., PH.D., F.R.S., SECRETARY TO THE SOCIETY.

Since the time of Brisson and Levaillant, I am not aware that any original observations have been made upon one of the most abnormal types of the strange avifauna of Madagascar—the *Leptosoma* of Vieillot—although several attempts have been made to fit it into different parts of the natural system. The collectors who have recently obtained access into the interior of Madagascar have sent

home many examples of both sexes of this bird, and I am thus enabled to offer a few remarks upon some remarkable points in its structure which have hitherto escaped observation.

The *Leptosoma* was first made known to science by Brisson\*, who describes both sexes in his usual accurate manner from specimens in the museum of M. l'Abbé Aubry. Brisson remarks upon the obvious differences between this bird and the ordinary *Cuculi*, which might entitle it to constitute a genus by itself†. Buffon figures both sexes in the 'Planches Enluminées' (pl. 587, 588), and in the text thereto copies parts of Brisson's description.

Levaillant also figures both sexes of this bird in his 'Oiseaux d'Afrique'‡, and pretends to have met with it in "Cafferland," as in the many other cases where the falsehood of his statements is equally glaring§. Several scientific appellations have been bestowed upon the bird upon the faith of these authors, such as *Cuculus afer*, Gm. S. N. i. 418, *Cuculus discolor*, Hermann, *Bucco africanus*, Stephens (Zool. ix. p. 25), and *Leptosomus viridis*, Vieill. Enc. Méth. iii. p. 1342||. Of these it becomes necessary to adopt *discolor* as the permanent specific designation of the species, although not the first given (as Gmelin's term involves a gross error in the locality), and to combine it with Vieillot's generic term *Leptosoma*, so that the correct name of the bird will be *Leptosoma discolor*.

Lesson in 1831 (Traité d'Ornithologie, p. 134) conceived the unhappy idea that the older authors had been wrong in regarding the somewhat dissimilar sexes of this bird as belonging to the same species, and accordingly made of the female a separate species under the name *Leptosomus crombec*. Prof. Reichenbach, not satisfied with this, has gone so far¶ as to establish a new genus (*Crombus*) on the female, and to place it in a different part of the system! In his 'Conspectus,' Prince Bonaparte retains this form near the *Cuculidæ*, but makes an independent family of it (*Leptosomidæ*). In his more recent 'Couspectus Systematis Ornithologiæ'\*\* he has removed it into the neighbourhood of the American *Bucconidæ*. Before attempting to solve the question as to which of these two views is most correct, I must ask leave to call the Society's attention to some remarkable points in its structure, which appear to have been hitherto unnoticed.

The first thing which strikes one as remarkable in examining the

\* Ornith. iv. p. 160, pl. xv. f. 1 & 2.

† "Species ista rostro donatur multo rectiore quam reliquæ omnes hujus generis species: quod rostrum nequaquam est superne convexum, sed angulosum. Nares habet longas, et versus mediam longitudinem mandibule superioris oblique positus. Ab aliis speciebus insuper discrepat cauda duodecim rectricibus conflata, dum in alteris decem tantum nec amplius unquam observavi. Hæc species posset suum genus constituere."

‡ Le Vouroudrion, v. t. 226 et 227.

§ Cf. Sundevall's Commentary on Levaillant in Kong. Sv. Vet. Ak. Handl., n. s., ii. pt. 1.

|| Here and in his 'Analyse' Vieillot writes the name *Leptosomus*. But *Leptosoma* is correct.

¶ Handb. d. Sp. Orn. ii. p. 51.

\*\* Ann. d. Sc. Nat. ser. 4. Zool. i. (1854).

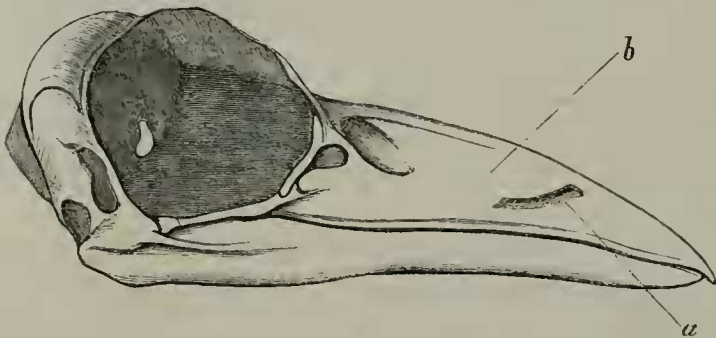
external characters of *Leptosoma discolor* is the extreme elongation of the feathers of the lores and their projection forward over the bill on each side. The bill is in reality long and strong, and the gape

Fig. 1.

Head of male *Leptosoma*.

very wide; but the basal half is entirely concealed from view by this extraordinary development of the loreal plumes. It is, I suppose, for the purpose of getting the nostrils out of the way of these that the openings of them are carried so far forward. They are placed laterally, rather nearer the apex of the beak than the front

Fig. 2.

Outline of the skull of *Leptosoma*.

(where the feathering commences), and consist of a narrow diagonal slit, just as in the genus *Eurystomus*. But in *Eurystomus* the apertures lie, as is the case in the majority of birds, at the base of the beak close to the frontal plumes. On examining the skeleton of *Leptosoma* we see at once that this remarkable formation has been effected by the elongation of the basal portion of the beak, and that the lateral coverings of the nasal passages (*alæ nasi*), which in most birds are entirely membranous, have in this form become completely ossified, so as to add very materially to the strength of the upper mandible.

A very similar formation occurs in *Eurystomus*, but is not carried to the same extent, the covering of the nasal passages remaining membranous in this form.

The wings of *Leptosoma* are of moderate length, reaching to about half the length of the tail from its base. The primaries are ten in number, the third, fourth, and fifth being nearly equal and longest, the second half an inch shorter, and the first more than an inch shorter again, being about equal to the eighth. The first six are narrowed towards the apex; the remaining four are broad-tipped like the secondaries. The secondaries are twelve in number.

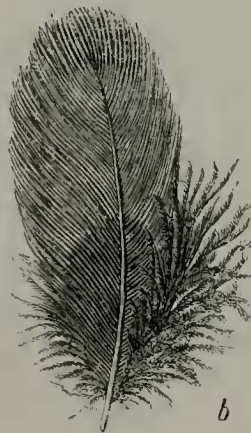
The tail consists of twelve rectrices of nearly equal length, and squared at the apices.

The feathering of *Leptosoma* presents some remarkable characters. The body-feathers have a long downy auxiliary plume, longer than

Fig. 3.



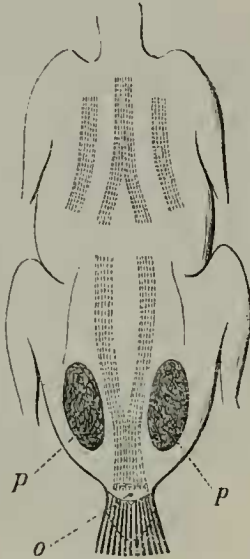
Fig. 4.



half the length of the feather itself. In *Eurystomus* there is a similar auxiliary plume, but not quite so highly developed. In the *Cuculidæ*,

I believe, the auxiliary plume is always deficient\*. The upper ptilosis also appears nearly similar to that assigned by Nitzsch to *Coracias* and *Eurystomus*. The spinal tract bifurcates between the shoulders, leaving a wide featherless space. The branches are then discontinuous for a short distance, but reappear in two gradually converging lines, which unite on the rump. But here a very abnormal

Fig. 5.



feature presents itself, which is found neither in the *Coraciidae* nor in any other family of the Order Picariæ. This is two large and highly developed powder-down patches (*p, p*), which are placed on the flanks, on each side of the rump. They are of an oval shape, and measure about  $1\frac{3}{4}$  inch in length by an inch in breadth. The development of these lubricating organs may perhaps account for the atrophy and almost total disappearance of the oil-gland, which can scarcely be recognized in the minute papilla (*o*, fig. 5), situated at the base of the two medial tail-feathers†.

\* Cf. Nitzsch, Pterylographie, p. 129.

† This is, I believe, the first instance of powder-down patches having been noticed to occur in any species of the Order Picariæ. Nitzsch (Pterylographie, p. 53) describes them as met with in the following genera:—

Nauclerus .....	} Order.
Elanus .....	
Cymindis .....	
Artamus .....	} Passerinae.
Tinamus .....	
Ardea and its affines.....	} Grallae.
Cancroma .....	
Eurypyga .....	

Mr. Bartlett has determined their presence in *Balaeniceps* (P. Z. S. 1861, p. 131) and *Rhinochetus* (ibid. 1862, p. 218).

The sternum of *Leptosoma*, a specimen of which Mr. A. Newton has kindly lent me from his extensive collection of these objects, does not, I must admit, present us with any very close resemblance to that of *Coracias*. At the same time I do not see that it is in any respect more like that of the *Cuculidæ*.

Fig. 6.

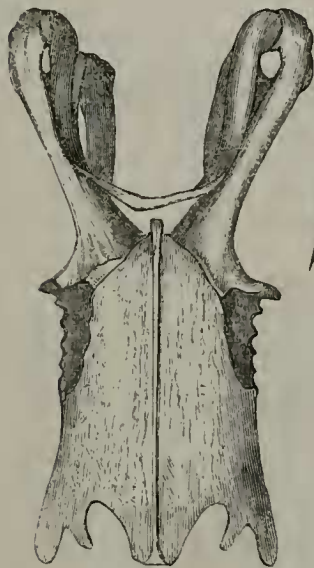
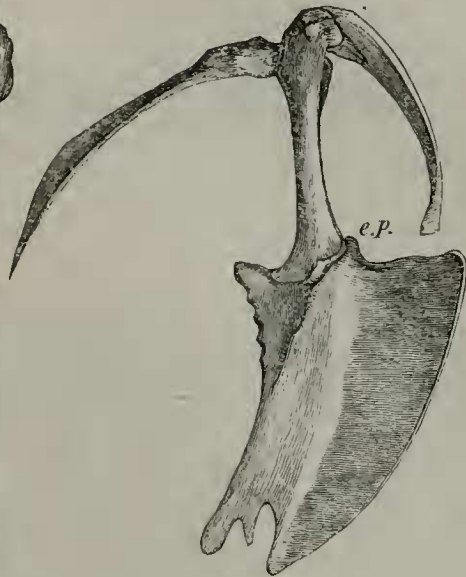


Fig. 7.

Sternum of *Leptosoma*.

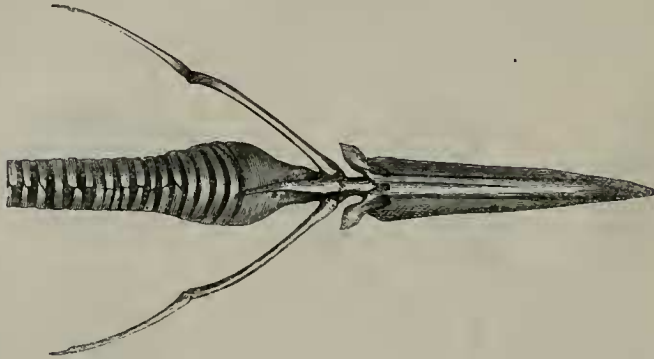
The two posterior fissures so characteristic of the greater number of forms of the order Picariæ are here run together, forming but one large opening, the apophysis between them not reaching to the line of the posterior margin, and the outer fissures being smaller and not so deep as the inner pair. In *Coracias* and *Eurystomus* the outer fissures are deeper, and the separating apophysis advances quite to the posterior margin. There are two other points in which the sternum of *Leptosoma* differs considerably from that of the *Coraciidæ*. These are (1) the very rudimentary condition of the episternal process (*e. p.*, fig. 7), and (2) the remarkable thickening of the rami of the furcula at their anterior extremities, and their attachment to the front of the coracoid by a massive head. In *Coracias* and *Eurystomus*\* the episternal apophysis is well-developed and terminates in a point, which advances some way forward between the coracoids, nor are the rami of the furcula thickened to any noticeable extent where they join the coracoids. It may also be noticed that the coracoids of *Leptosoma* overlap one another a little at their junction with the sternum, as is the case with some of the *Accipitres*.

The tongue of *Leptosoma*, of which Mr. Newton has also kindly lent me a specimen, is remarkable for its thin horny nature and pel-

\* Cf. Blanchard, Recherches sur les caractères ostéologiques des oiseaux, Ann. d. Sc. Nat. ser. 4. Zool. vol. xi. p. 127.

lucid appearance, and (as far as I can tell, the example not being quite perfect) for being without any traces of laceration at its ex-

Fig. 8.



Tongue of *Leptosoma*.

tremity. It is much lengthened, and of nearly uniform thickness throughout; but the sides are bent upwards, leaving a deep medial channel, which grows shallower towards the base, where it terminates in two simple lateral projections without any traces of papillæ.

In a note to his 'System der Pterylographie' (p. 131), Nitzsch has stated that in two examples of *Leptosoma* examined by him the outer toe "appeared to have four phalanges," instead of five, the normal number. This, however, is not the case: *Leptosoma* does not diverge from the ordinary rule among birds in this respect. The structure of its feet may be described as follows:—

The tarsus is rather longer than the second digit, measuring 1·2 in. in length. It is covered in front with a series of ten or twelve irregular oblong scutes, which are divided in the upper and lower portion of the tarsus, but entire in the middle. On the outer side is a series of smaller similar scutes. Behind, the tarsus is covered with numerous small irregular hexagonal scutes, which extend over the lower surface of the planta.

The first or posterior digit measures 0·63 in. in length, including the nail, and is placed behind in its usual position. The second and third digits are placed directly in front, and measure 0·63 and 1·5 in. respectively (with the nail). They show no appearance of syndactylism, being separated nearly to the base. The fourth digit measures 1·11 in. in length, and, as I have already stated, has the normal number of five phalanges—the first two being very short, each measuring only about 0·5 in. in length. It is articulated not in a directly reversed position, as among the more typical *Zygodactylæ*, but laterally, rather more behind than in front. It will therefore be seen that *Leptosoma*, even in this respect, diverges widely from the *Cuculidæ*, *Bucconidæ*, &c., in which the fourth digit is placed in a directly reversed position.

So much, then, I am at present able to say concerning the peculiarities of this remarkable type. In order to refer *Leptosoma* deci-

sively to its proper place in the natural series, an examination of the soft parts of its structure still remains to be made, which as yet I have had no opportunity of doing. But it appears to me that sufficient is known to show that *Leptosoma* can no longer be left as a genus of the family *Cuculidæ*, from which it differs in many important points, particularly in the form of the nostrils, in the presence of an auxiliary plume on the body-feathers, in having twelve tail-feathers, and in the structure of its feet. As far as I can at present form an opinion, a more natural situation for *Leptosoma* would be as the type of a separate family in the neighbourhood of the *Coraciidæ*. The singular structure of the nostrils very much resembles that of *Eurystomus*. *Eurystomus* also has the auxiliary plume, and the same number of tail-feathers—although differing from *Leptosoma* in the form of the sternum and the structure of the feet, so that they could hardly be associated together in the same family.

I have as yet had no opportunity of seeing more than a stuffed specimen of another singular Madagascar type—the *Brachypteracias leptosomus*; but I think it very probable, from the superficial examination I have made of it, that this, as suggested by Lesson, may be the missing link which connects *Leptosoma* with the *Coraciidæ*.

#### EXPLANATION OF THE FIGURES.

- Fig. 1. Head of *Leptosoma*, showing the projection of the loreal and frontal plumes, and the position of the nostrils.  
 Fig. 2. Outline of the skull of *Leptosoma*, showing the position and form of the nasal apertures (*a*) and the ossified covering (*b*).  
 Fig. 3. Lower surface of a feather from the back of a male *Leptosoma*, with part of the inner web removed, so as to show the auxiliary plume more clearly.  
 Fig. 4. Lower surface of a feather from the breast of a female.  
 Fig. 5. Upper surface of *Leptosoma* with feathers removed (reduced), showing the bifurcation of the spinal tract and the position of the two powder-down patches (*p, p*) and oil-gland (*o*).  
 Figs. 6, 7. Sternum of *Leptosoma*.  
 Fig. 8. Tongue and hyoid bones of *Leptosoma*.

#### 6. NOTE ON THE NIDIFICATION OF *MIRAFRA HORSFIELDI*.

BY E. P. RAMSAY, OF DOBROYDE, N.S.W.

Not having hitherto met with any description of the nest and eggs of *Mirafra horsfieldi* of this colony, and deeming it a subject of regret that the eggs of so common a bird in our neighbourhood should remain any longer undescribed, I beg leave to offer a few remarks upon the habits and nidification of this Lark.

Our *Mirafra* (for, as far as is yet known, we have only one species) shows a decided preference for the cultivated parts of the country, although it may be found upon the grassy slopes, on the borders of creeks, and on the plains in the interior.

It is very plentiful in the hay-, barley-, and wheat-fields, where it may be frequently seen perched upon the top of a sheaf, pecking the